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- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A SCREW, IN PARTICULAR FOR THE FASTENING OF PLASTER BOARDS

(57) Abstract: A special screw for the fastening of plaster boards is configured with a block-shaped screw head which on the under side has an annular cavity around the screw shank. When use is made of such a screw, the plaster mass which is displaced by the screw will be compressed inside the said cavity, and since the under side of the screw head in itself does not give rise to any radial pressing-out of the mass, a bulging-out of the plaster which would otherwise typically arise around the fully screwed-in screw head is completely avoided. The subsequent sanding work which would otherwise be necessary can hereby be reduced to a minimum or be totally eliminated.

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**A screw, in particular for the fastening of plaster boards.**

The present invention concerns a special screw for use in the fastening of building boards of plaster or corresponding material. It is a widespread demand with such fastenings that the heads of the screws with plane upper or outer side must lie flush with or slightly countersunk in the surface of the plaster board or the paper covering with which the board is normally provided, whereby problems arise with regard to the plaster material which the flat-headed screw must necessarily displace, in that unfortunately it is seen that this results in a distinct bulging-out of the material around the head of the screw. The immediate displacement takes place out to the sides, but the situation arises that during the initial screwing-in, the screw thread can have a milling-out effect on the plaster, which thus in a crumbled form is pressed out along the screw, whereby the covering paper or the cardboard around the screw is pressed out into a projecting collar and is partly broken. With the final screwing-in, the head of the screw, which like all flat-headed screws is normally conical, will thus press this collar outwards with further breaking of the covering paper. It merely remains for it to be necessary for these collars around the heads of the screws to be smoothed off by sanding before the subsequent filling out of abutting joints and screw holes.

It is the object of the invention to provide a special screw, the use of which eliminates or considerably reduces the relevant sanding work.

Many attempts have been made to develop suitable screws which can take advantage of the fact that to some degree the plaster material allows itself to be compressed locally in under the head of the screw. It has hereby even been suggested to form the uppermost part of the screw shank with a few threads in the opposite direction, so that during the final phase of the screwing-in an inwards-directed milling of the material at the outer side takes place, whereby the head

of the screw will have less material to displace. The problem is hereby undoubtedly reduced, but it is not solved in a completely satisfactory manner.

5 The development would appear to have been brought  
to an end with a special screw with a relatively thin screw  
shank with double-cut thread (3-5 mm), and with a screw head  
configured like the mouth of a trumpet ending with a quite  
thin outer edge with a diameter typically in the order of 8.5  
10 mm. In that the back of the screw head will hereby extend out  
towards the edge while forming a relatively small angle with  
the front of the head, in connection with the small thickness  
of the outer edge this will mean that the slight degree of  
material compression which will arise under random areas of  
the screw head will be inwardly-directed in the material and  
15 only to a modest degree outwardly-directed from the screw edge.  
This type of screw is widely accepted, but it is also accepted,  
however, that a certain degree of ripping-up around the edge of  
the screw head will still normally arise, and even though this  
projecting ripping-up is only slight, it  
20 must still be subsequently removed by sanding.

With the invention it has been seen to be possible to provide a screw which does not give rise to any form of  
bulging-out or ripping-up whatsoever, which in practice will  
be extremely attractive. This screw is based on the quite  
25 different consideration that there is no reason to seek to  
achieve a short penetration depth of the outer edge area of  
the screw head, merely providing that this is configured in  
such a manner that it does not give rise whatsoever to any  
distinct outwardly-directed compression. A corresponding con-  
30 sideration is that a head of a screw, regardless of its profile,  
will be prevented from producing an outwardly-directed compression  
when it is configured with skirt part extending rearwards from  
the circumference of the screw head, which when the screw is  
screwed in will form a mechanical shielding-off of that material  
35 area in which a compression of the material can possibly arise  
with the final screwing-in.

A screw according to the invention will thus be characterised by an appearance which is radically different

from the above-mentioned, hitherto-preferred screw, i.e. by being provided with a decidedly "thick" outer edge on the screw head. This will appear quite illogical until it is seen that the back of the screw head within the outer edge is  
5 "hollow", so that a compression of the material can arise without this in any way being able to spread to the area outside the head of the screw.

In the following, the invention will be explained in more detail with reference to the drawing, in which

10 fig. 1 is sectional view of a screw according to the invention, shown during the initial screwing-in of the screw head in a plaster board surface, while

fig. 2 is a corresponding view of an almost complete screwing-in, and

15 fig. 3 is a corresponding view of the finally completed screwing-in.

The shown screw has a screw shank 2 with a thread 4, above which the neck 6 of the screw is configured with the same thickness as the core of the thread, i.e. preferably not  
20 with a greater thickness than this, and a screw head 8 which immediately appears as a "block head" with cylindrical outer side 10. The screw head has a slot 12 of any usable type.

25 The underside of the screw head has an annular recess 14 around the neck 6 of the screw, said recess being of curved cross-section with gradual transition to the screw neck and with a short, rounded-off transition 16 to the outer side 10 of the screw head.

30 In fig. 1 the screw 1 is shown screwed so far into a plaster board 20 that it has started to penetrate an under layer of wood W. Until a firm threaded engagement with the wood is achieved, there will typically occur a certain  
35 "over-turning" of the screw so that its thread has worked as an outwardly-directed milling tool which has brought about a pushing-out of crumbled plaster in the formation of a projecting collar 22 around the screw shank 2, with associa-

ted ripping-up of the covering paper or cardboard on the plaster board.

In fig. 2 the screw is shown screwed so far in that the outer under edge 16 of the screw head has just begun to  
5 press the paper-covered surface of the board inwards. The under edge 16 could be sharp, but a small chamfering is preferred for a milder handling of the cover paper, which will thus be quite slightly rounded-down just outside the cutting-in which will arise with the subsequent penetration of the screw  
10 head into the plaster material. It must be noted that the preferred diameter of the screw head is only 6-8 mm. It will be seen that the formation of the collar 22 will thereafter be accommodated completely within the annular recess 14. For use in softer materials, use can well be made of screw heads  
15 of substantially larger diameters.

During the further screwing-in, the head 8 will gradually penetrate deeper into the plaster, cf. fig. 3, whereby the plaster will be compressed locally. This compression will immediately manifest itself most strongly under the  
20 downwards-extending edge area of the screw head, but this most strongly compressed material will naturally seek inwards and upwards under the "dome" which is formed by the recess 14, as shown by the arrow in fig. 3, whereby the differentiated compression in under the screw head will be substantially  
25 ly equalised to an acceptable level despite the large peripheral thickness of the screw head.

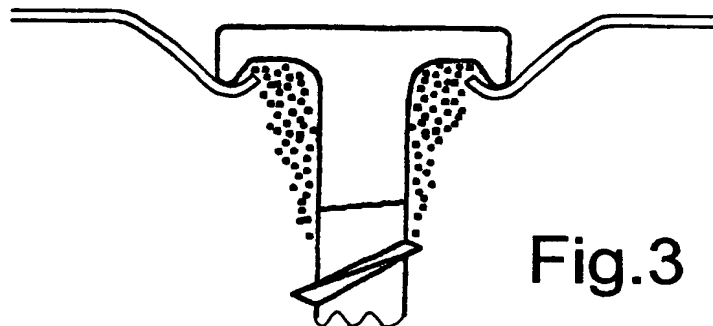
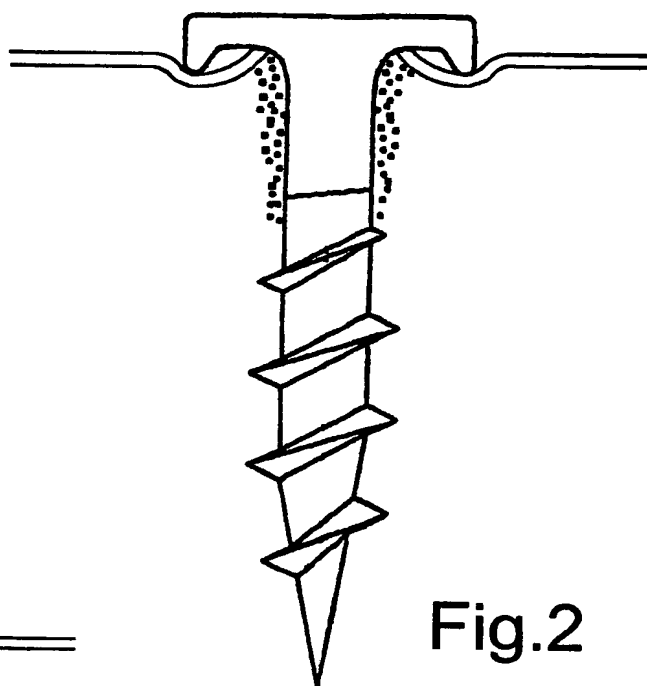
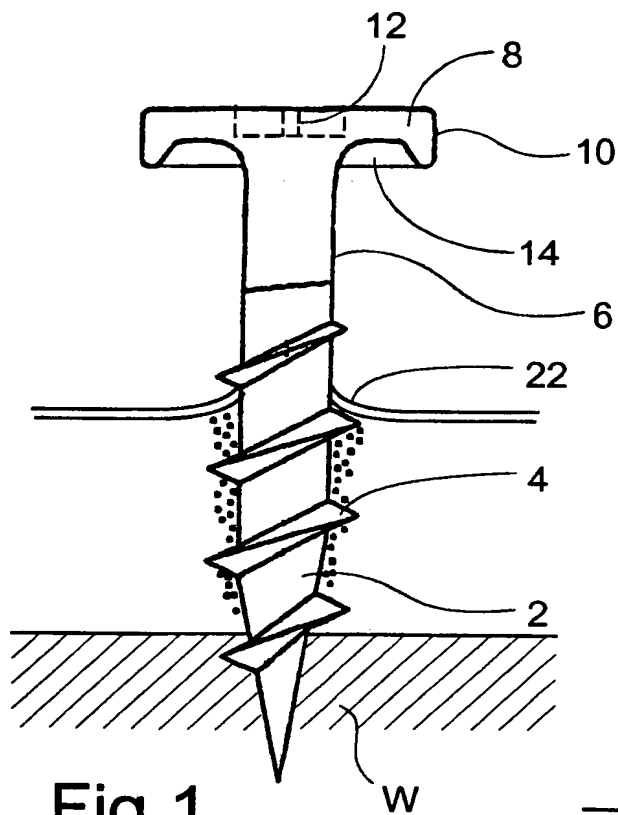
A related and even more relevant result will be that no distinct material compression will arise at all immediately outside the screw head, and nor in the least near to  
30 the outer surface of the plaster board. Therefore, when the screw has been screwed in to its final position, where the outer side of the screw head lies flush with the surface plane of the plaster board, or as shown by the stippled line in fig. 3 is slightly countersunk herein, there will not arise  
35 the slightest bulging-out or ripping-up of the board from this plane around the screw head, i.e. the board can subsequently be treated with filling material and painted or wallpapered without any intermediate sanding.

It is of extra significance that the said sanding is avoided, not only in order to avoid the related work, but also because the filler can adhere poorly to the sanded parts which display crumbled material. It will be seen in fig. 3  
5 that the broken surface of the plaster board is completely clean, in that it displays only the indented layer of cover material around the screw head. The resulting indentation can be treated with filler in a fully durable manner.

## C L A I M S

1. Screw, in particular for the fastening of cladding plates of the plaster board type, with a screw shank and a  
5 screw head with a groove or the like in the top, c h a r a c  
t e r i s e d in that the screw head is configured with a  
substantially flat top and with a skirt part extending down-  
wards from the outer edge of said head top, and which within  
the underside of the screw head forms an annular cavity  
10 around the screw shank.
2. Screw according to claim 1, c h a r a c t e r i s e  
d in that the screw shank extends over into said annular ca-  
vity in a locally rounded-off manner.
3. Screw according to claim 1, c h a r a c t e r i s e  
15 d in that said cavity meets the under edge of the skirt part  
in a wholly or semi-sharp manner.

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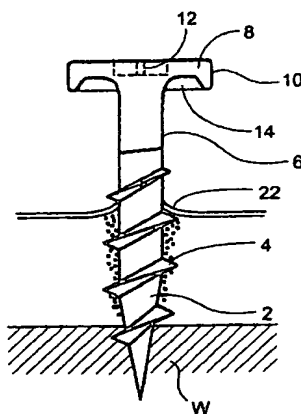
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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 00/00415

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: F16B 25/00, F16B 25/10, F16B 35/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: F16B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0447902 A1 (ADOLF WÜRTH GMBH & CO. KG), 25 Sept 1991 (25.09.91), column 4, line 18 - line 35, figure 3, details 22,23  --	1-3
X	DE 19508454 A1 (HAUS, G.), 12 Sept 1996 (12.09.96), figure 1  -- -----	1-3

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

## \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
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Name and mailing address of the ISA:

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

SA 096518

International application No.

03/10/00

PCT/DK 00/00415

EP	0447902	A1	25/09/91	AT	110149	T	15/09/94
				DE	4008962	A	26/09/91
				DE	59102535	D	00/00/00
				DK	447902	T	02/01/95
				ES	2057634	T	16/10/94

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DE	19508454	A1	12/09/96	NONE			
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